

CLAIMS

What is claimed is:

1. A method comprising:
delivering one or more pacing pulses to an atrium;
determining one or more atrioventricular conduction interval times based on the one or more pacing pulses; and
determining a respiratory characteristic based at least in part on the one or more atrioventricular conduction interval times.
2. The method of claim 1, wherein the respiratory characteristic comprises a respiratory cycle length.
3. The method of claim 1, wherein the atrial pacing occurs at a frequency that is at least double a respiratory frequency.
4. The method of claim 1, wherein the atrial pacing occurs at a rate that varies with respect to an intrinsic rate.
5. The method of claim 1, wherein the atrial pacing occurs at a rate that varies with respect to time.
6. The method of claim 1, further comprising determining whether the respiratory characteristic indicates apnea.
7. The method of claim 6, further comprising discriminating between obstructive apnea and central apnea.
8. The method of claim 7, wherein the discriminating relies at least in part on a measurement related to chest movement.

9. The method of claim 7, wherein the discriminating relies at least in part on a known respiratory characteristic representative of obstructive apnea or central apnea.

10. A method comprising:
delivering one or more pacing pulses to an atrium;
determining one or more atrioventricular conduction interval times based on the one or more pacing pulses; and
determining an autonomic characteristic based at least in part on the one or more atrioventricular conduction interval times.

11. The method of claim 10, wherein the autonomic characteristic comprises an autonomic shift.

12. The method of claim 10, wherein the atrial pacing occurs at a frequency that is at least double an autonomic frequency.

13. The method of claim 10, wherein the atrial pacing occurs at a rate that varies with respect to an intrinsic rate.

14. The method of claim 10, wherein the atrial pacing occurs at a rate that varies with respect to time.

15. A method comprising:
determining one or more atrioventricular conduction interval times;
and
determining a respiratory characteristic based at least in part on the one or more atrioventricular conduction interval times.

16. The method of claim 15, wherein the respiratory characteristic comprises a respiratory cycle length.

17. The method of claim 15, further comprising delivering one or more pacing pulses to an atrium, and wherein determining the atrioventricular conduction interval time comprises determining an interval from the pacing pulses to an intrinsic ventricular event.

18. The method of claim 15, further comprising determining whether the respiratory characteristic indicates apnea.

19. A method comprising:
determining one or more atrioventricular conduction interval times;
and
determining an autonomic characteristic based at least in part on the one or more atrioventricular conduction interval times.

20. The method of claim 19, further comprising atrial pacing at a frequency that is at least double a respiratory frequency.

21. An apparatus comprising:
means for determining one or more atrioventricular conduction interval times; and
means for determining a respiratory characteristic based at least in part on the one or more atrioventricular conduction interval times.

22. An apparatus comprising:
means for determining one or more atrioventricular conduction interval times; and
means for determining an autonomic characteristic based at least in part on the one or more atrioventricular conduction interval times.

23. An implantable cardiac stimulation system comprising:
sensing circuitry operative to sense atrial and ventricular events;
a processor connected to the sensing circuitry and operative to
determine one or more atrioventricular conduction interval times based on
the atrial and ventricular events, wherein the processor is further
operative to determine a respiratory characteristic based at least in part
on the one or more atrioventricular conduction interval times.

24. The system of claim 23, wherein the processor is operative
to determine whether the respiratory characteristic indicates apnea.

25. The system of claim 24, wherein the processor is operative
to discriminate between obstructive apnea and central apnea.

26. The system of claim 23, further comprising a pulse
generator operative to generate stimulation pulses for delivery to a
patient's heart, and at least one electrode connected to the pulse
generator and configured for implant within the patient to deliver the
stimulation pulses to the patient's heart, wherein the processor is
operative to determine atrioventricular conduction interval times based on
the delivered stimulation pulses and corresponding sensed ventricular
events.

27. An implantable cardiac stimulation system comprising:
sensing circuitry operative to sense atrial and ventricular events;
a processor connected to the sensing circuitry and operative to
determine one or more atrioventricular conduction interval times based on
the atrial and ventricular events, wherein the processor is further
operative to determine an autonomic characteristic based at least in part
on the one or more atrioventricular conduction interval times.

28. The system of claim 27, further comprising a pulse generator operative to generate stimulation pulses for delivery to a patient's heart, and at least one electrode connected to the pulse generator and configured for implant within the patient to deliver the stimulation pulses to the patient's heart, wherein the processor is operative to determine atrioventricular conduction interval times based on the delivered stimulation pulses and corresponding sensed ventricular events.